

Date: Tuesday, 22/05/2007 10:11:54 AM
User: Linda Lacelle

Process Sheet

| | | | |
|-----------------------|---------------------------------------|------------------|----------------------|
| Customer | : CU-DAR001 Dart Helicopters Services | Drawing Name | : X-TUBE 412 |
| Job Number | : 32445 | | |
| Estimate Number | : 12727 | | |
| P.O. Number | : <i>N/A</i> | Part Number | : D412664245 |
| This Issue | : 22/05/2007 | S.O. No. | : <i>N/A</i> |
| Prsht Rev. | : NC | Drawing Number | : D412-664-245 REV C |
| First Issue | : <i>N/A</i> | Project Number | : N/A |
| Previous Run | : 32211 | Drawing Revision | : C |
| | | Material | : <i>N/A</i> |
| Written By | : <i>[Signature]</i> | Due Date | : 01/06/2007 |
| Checked & Approved By | : <i>[Signature]</i> | Qty: | 1 Um: Each |
| Comment | : Est Rev:A New Issue 07-02-14 JLM | | |

Additional Product

Job Number:



| Seq. #: | Machine Or Operation: | Description : |
|---------|-----------------------|---------------|
|---------|-----------------------|---------------|

| | | |
|-----|----|------------------|
| 1.0 | DC | DOCUMENT CONTROL |
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Comment: DOCUMENT CONTROL

Photocopy bluefile & type labels per PPPD412-664-205 CHG001

N/A

LB 07/05/22

| | | |
|-----|----------|--------------------|
| 2.0 | D6009129 | Crosstube Material |
|-----|----------|--------------------|



Comment: Qty.: 1.0000 Each(s)/Unit Total : 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D6009-129 Crosstube *B26548*

Check OD = 3.500"; ID = 2.250"

LB 07/05/22

| | | |
|-----|------------|----------------------------|
| 3.0 | MORI SEIKI | MORI SEIKI CNC LATHE LARGE |
|-----|------------|----------------------------|



Comment: 1-TURN AS PER FOLIO FA690 & DWG D412-664-245,

FOLIO REV: *11*

DWG REV: *C*

2-DEBURR AS REQUIRED

LB 07/05/22

| | | |
|-----|-----|--|
| 4.0 | QC2 | INSPECT PARTS AS THEY COME OFF MACHINE |
|-----|-----|--|



Comment: INSPECT PARTS AS THEY COME OFF MACHINE

LB 07/05/24

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|-----|-----|--------------|
| 5.0 | QC8 | SECOND CHECK |
|-----|-----|--------------|



Comment: SECOND CHECK

LB 07/05/24

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
| DATE | STEP | PROCEDURE CHANGE | By | Date | Qty | Approval Chief Eng / Prod Mgr | Approval QC Inspector |
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

QA: N/C Closed: _____ Date: _____

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Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 32445

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

6.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Polish entire outside surface of crosstube

Job 7-5-28

7.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP 7-5-28

8.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat as per QSI 005 4.1

Job 7-5-28

9.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

DP 7-5-29

10.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

DP 7-5-29

11.0

BENDING

BENDING MACHINE



Comment: BENDING MACHINE

Bend tube as per Dwg D412-664-243 using CNC bender program 412-af and Folio FT010

FL 7-5-30

12.0

QC15

DIMENSIONAL CHECK OF X-TUBES



Comment: DIMENSIONAL CHECK OF X-TUBES

07-06-04 @

13.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Mark cut lines as per dwg D412-664-245

2-Cut tube as per dwg D412-664-245

3-Deburr and engrave part#/batch# per dwg

7-6-4 Job 7-6-5

| W/O: | | WORK ORDER CHANGES | | | | | |
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Drawing Name: X-TUBE 412

Job Number: 32445

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

14.0

HAND FINISHING1

HAND FINISHING RESOURCE #1



Comment: HAND FINISHING RESOURCE #1

Chemical Conversion Coat Tube & Cuffs as per QSI 005 4.1

Jb 7-6-5

15.0

QC3

INSPECT POWDER COAT/CHEMICAL CONVERSION



Comment: INSPECT POWDER COAT/CHEMICAL CONVERSION

Jb 7-6-5 (1)

16.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

Jb 7-6-5 (1)

17.0

OUTSIDE SERV.10

OUTSIDE SERVICES -LG



Comment: Sub-Contracting OUTSIDE SERVICES

Liquid Penetrant Inspection as per QSI 038Or

Issue P/O: 3908 LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

Co 7/06/06 (1)

18.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Inspect for transit damage

Ensure copy of NDT results attached to work order.

Co 7/06/06 (1)

19.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: Inspect for damage & ensure results are as per Dwg D412-664-203

Jb 7-6-5 (1)

20.0

D36061

CUFF



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

CUFF

Batch: 51474

AT 07-06-06

21.0

CR3212407

CHERRY RIVET



Comment: Qty.: 44.0000 Each(s)/Unit Total: 44.0000 Each(s)

CHERRY RIVET

Batch: 104071

AT 07-06-06

| W/O: | | WORK ORDER CHANGES | | | | | |
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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 32445

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

22.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

1-Drill Rivet holes as per Dwg D412-664-245

2-Drill pilot holes in tube as per Dwg D412-664-245

3-Ream hole to finish size in tube as per Dwg D412-664-245

4-Deburr & Inspect for surface damage. Repair damage within limits as per Dwg D412-664-245

5-Chemical conversion coat per dwg and QSI 005

5-Rivet Cuffs as per Dwg D412-6647-245. with Sika flex in Between tube & Cuff

A/R SIKAFLEX -241/-291 BATCH: 103561

RT
07-06-06

23.0

QC5

INSPECT WORK TO CURRENT STEP



Comment: INSPECT WORK TO CURRENT STEP

24.0

SPRAY PAINTING

SPRAY PAINTING



Comment: SPRAY PAINTING

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

RT 07-06-06

25.0

QC14

INSPECT SPRAY PAINT



Comment: Inspect Spray Paint

Wrap in plastic bag to protect from scratches

07-06-07

26.0

D31891

Chafing Shield



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

Chafing Shield

Batch: 31147

RT 07 06 07

| W/O: | | WORK ORDER CHANGES | | | | | |
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Process Sheet

Customer: CU-DAR001 Dart Helicopters Services

Drawing Name: X-TUBE 412

Job Number: 32445

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

27.0

D3595

Rubber Cushion (per sq ft)



Comment: Qty.: 0.0536 sf(s)/Unit Total: 0.0536 sf(s)

Rubber Cushion

Cut to .630" X 5.7" X 2PCS

Batch:

~~3995~~ 31948

RT 07-06-07

28.0

D28961

Support



Comment: Qty.: 1.0000 Each(s)/Unit Total: 1.0000 Each(s)

Pick:

Qty Part number Description Batch

1 D2896-1

Support

27266

RT 07-06-07

29.0

D2856600

Abrasion Strip



Comment: Qty.: 0.9450 f(s)/Unit Total: 0.9450 f(s)

Abrasion Strip

2 X D2856-600-1009

Batch:

26650

RT 07-06-07

30.0

MS2192028

Clamp(per MIL-DTL-8783C)



Comment: Qty.: 4.0000 Each(s)/Unit Total: 4.0000 Each(s)

Pick:

Qty Part number Description Batch

4 MS21920-28

Clamp

102534

RT 07-06-07

31.0

MS2192030

clamp(per MIL-DTL-8783C)



Comment: Qty.: 2.0000 Each(s)/Unit Total: 2.0000 Each(s)

clamp(per MIL-DTL-8783C)

batch:

~~122931~~ 160154

RT 07-06-07

32.0

LANDING GEAR 1

LANDING GEAR RESOURCE 1



Comment: LANDING GEAR RESOURCE 1

Assemble as per Dwg D412-664-245

Install Chaffing Sheilds

} RT 07-06-07

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
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Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes ☒ No ☐ DQA: ☒ Date: 07/06/08
 QA: N/C Closed: _____ Date: _____

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Drawing Name: X-TUBE 412

Job Number: 32445

Part Number: D412664245

Job Number:



Seq. #:

Machine Or Operation:

Description :

Instal support with magnobond 6398 per dwg D412-664-245,
cure for 12hrs before packaging.

Time & date of application:

Batch:

5:00 07-06-07

103628

RT 07-06-07

33.0

QC5

INSPECT WORK TO CURRENT STEP



07-06-07 (1)



Comment: INSPECT WORK TO CURRENT STEP

34.0

PACKAGING 1

PACKAGING RESOURCE #1



Comment: PACKAGING RESOURCE #1

Identify and pack for shipping as per PPP D412-664-205

*****Ensure tube is not packaged if curing time is less than 12 hrs, see step 27 for application time & date

Time & date of packaging:

7/6/8 12:30

Location:

PPP Rev:

PPP

B32177

07/6/8 (1)

35.0

QC21

FINAL INSPECTION/W/O RELEASE



Comment: FINAL INSPECTION/W/O RELEASE

07/06/08 (1)

Job Completion



07/06/08

Dart Aerospace Ltd

| W/O: | | WORK ORDER CHANGES | | | | | |
|------|------|--------------------|----|------|-----|-------------------------------------|--------------------------|
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NOTE: Date & initial all entries

DART

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|-------------------------------|--------------------------------|--|------------------------|
| DESIGN <i>90</i> | DRAWN BY <i>90</i> | DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA | |
| CHECKED <i>[Signature]</i> | APPROVED <i>[Signature]</i> | DRAWING NO. D412-664-245 | REV. C SHEET 1 OF 3 |
| DATE 07.03.29 | | TITLE CROSSTUBE ASS'Y (412 LOW-N AFT) NTS | |
| A | 06.12.01 | NEW ISSUE | |
| B | 07.03.01 | CHG CUFF AREA, CHG RUBBER CUSHION | |
| C | 07.03.29 | CHG RIVET AND RUBBER CUSHION | |

RELEASED07.04.24 *[Signature]***PARTS LIST:**

| Qty | Part Number | Description |
|-----|-------------------|---|
| X | D412-664-245 | CROSSTUBE ASSEMBLY (412 LOW-NARROW AFT) |
| 1 | D6009-129 | CROSSTUBE |
| 2 | D2856-600-1009 | ABRASION STRIP |
| 1 | D2896-1 | SUPPORT |
| 2 | D3189-1 | CHAFING SHIELD |
| 2 | D3595-063-570 | RUBBER CUSHION |
| 2 | D3606-1 | CUFF |
| 44 | CR3212-4-07 | RIVET (OR M7885/3-4-07) |
| 4 | MS21920-28 | CLAMP |
| 2 | MS21920-30 | CLAMP (OR MS21920-32) |
| A/R | MAGNOBOND 6398 | ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE) |
| A/R | SIKAFLEX-241/-291 | SEALANT (OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT) |

GENERAL NOTES:

- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 2) MATERIAL: MANUFACTURED FROM D6009-129
FINISHED LENGTH = 123.59±0.020 (BEFORE BENDING/TRIMMING)
- 3) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART 005 4.2
- 4) PART IS SYMMETRIC ABOUT CENTERLINE.
- 5) RUN-OFF PART. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 6) BEND PROGRESSIVELY WITH A MINIMUM OF 8 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D., EXCEPT UP TO 10% IS ALLOWED IN AREA NOTED.
- 7) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 8) SCRIBE DART PART NUMBER AND BATCH NUMBER IN THIS AREA WITH VIBRATING STYLUS.
- 9) INSTALL D2856-600-1009 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF CROSSTUBE PER QSI 035.
- 10) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 11) APPLY A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 TO THE SURFACE OF D2896-1 THAT WILL BE IN CONTACT WITH THE CROSSTUBE. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 12) INSTALL MS21920-30 CLAMPS (OR -32) WITH D3595-063-570 RUBBER CUSHIONS TO SECURE D2896-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE SUPPORT.
- 13) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 14) INSTALL D3606-1 CUFF AFTER CHEMICAL CONVERSION COAT BUT BEFORE PAINT, WITH A LAYER OF SIKAFLEX-241/-291 OR PROSEAL 890 OR MIL-S-8802 CLASS B2 SEALANT BETWEEN CUFF AND CROSSTUBE. SEAL EDGE OF CUFF TO ENSURE NO GAPS.
- 15) TOUCH-UP HOLES WITH CHEMICAL CONVERSION COAT.

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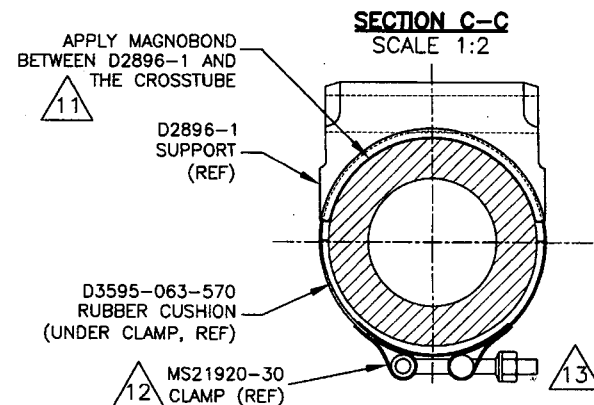
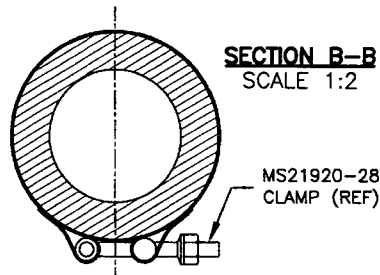
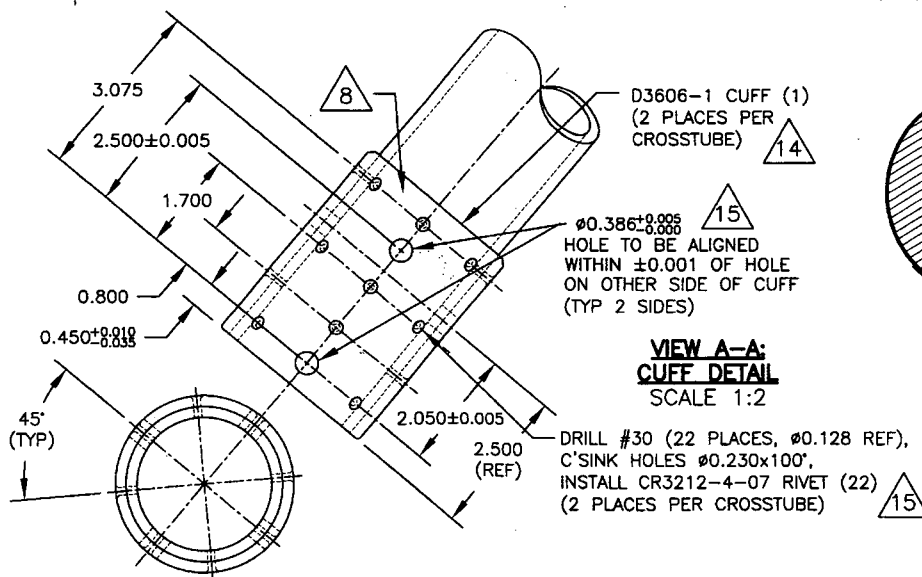
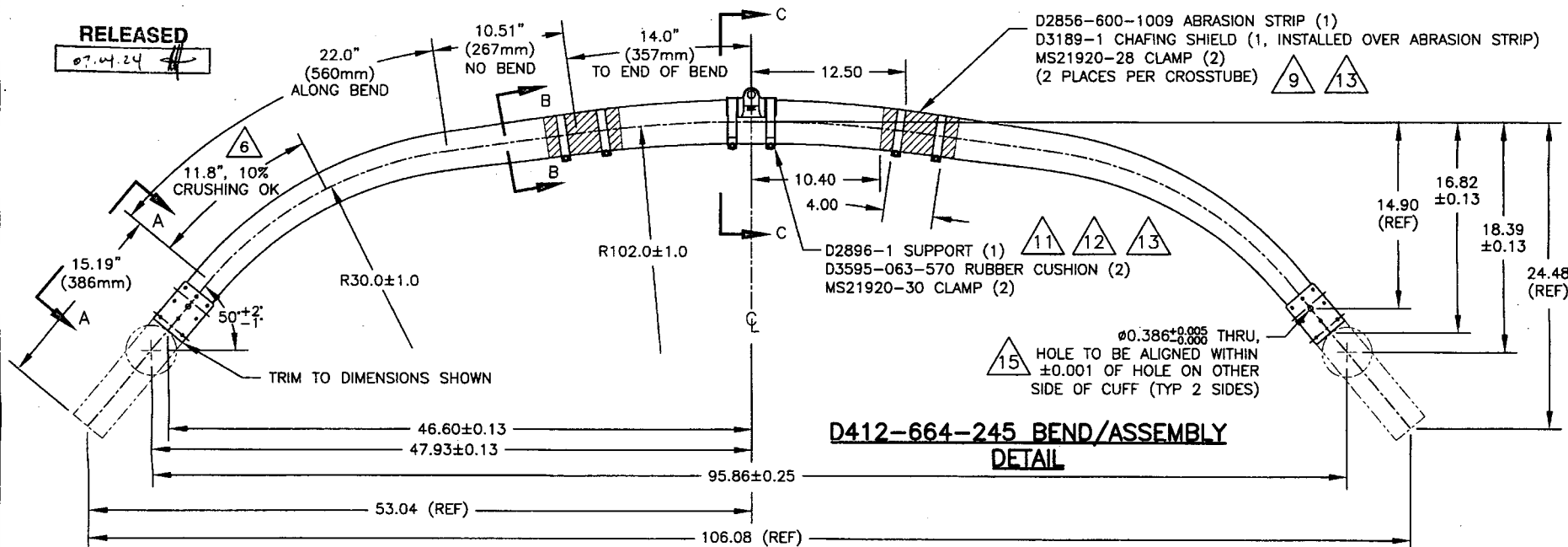
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NOTE: Date & initial all entries

RELEASED



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| DESIGN | q | DRAWN BY | q |
| CHECKED | # | APPROVED | # |
| DATE | 07.03.29 | TITLE | CROSSTUBE (412 LOW-NARROW AFT) |
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| DRAWING NO. D412-664-245 | | REV. C SHEET 2 OF 3 SCALE 1:8 | |

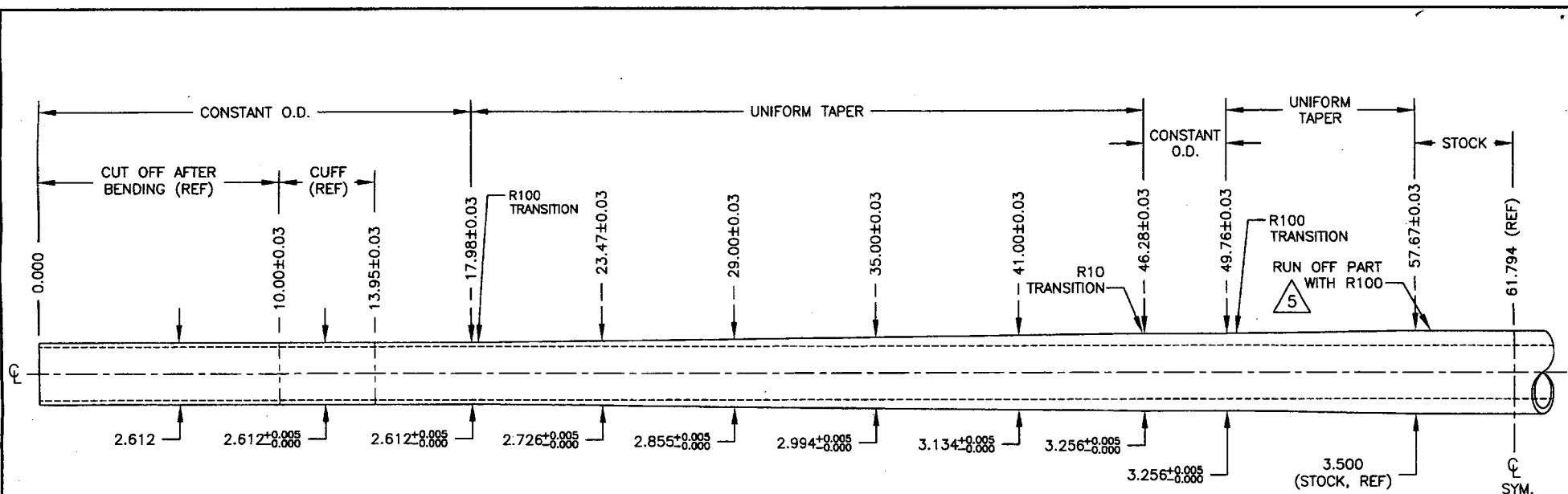
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NOTE: Date & initial all entries



D412-664-245 MACHINING DETAIL

RELEASED

07.04.19

| | | | | | |
|--|--|---|-----------------------------|-----------------------------|---|
| COPYRIGHT © 2006 BY DART AEROSPACE LTD. | | DESIGN <i>qp</i> | DRAWN BY <i>qp</i> | DART | DART AEROSPACE LTD. MISSISSAUGA, ONTARIO, CANADA |
| THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD. | | CHECKED <i>[Signature]</i> | APPROVED <i>[Signature]</i> | DRAWING NO. D412-664-245 | REV. C SHEET 3 OF 3 |
| DATE 07.03.29 | | TITLE CROSSTUBE (412 LOW-NARROW AFT) 1:4 | | | |

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|-----------------------------------|--|-------------------------|
| DART AEROSPACE LTD | | Work Order: 32445 |
| Description: X TUBE 412 | | Part Number: 0412611245 |
| Inspection Dwg: 0412611245 Rev: C | | Page 1 of 1 |

FIRST ARTICLE INSPECTION CHECKLIST

☒ First Article ☐ Prototype

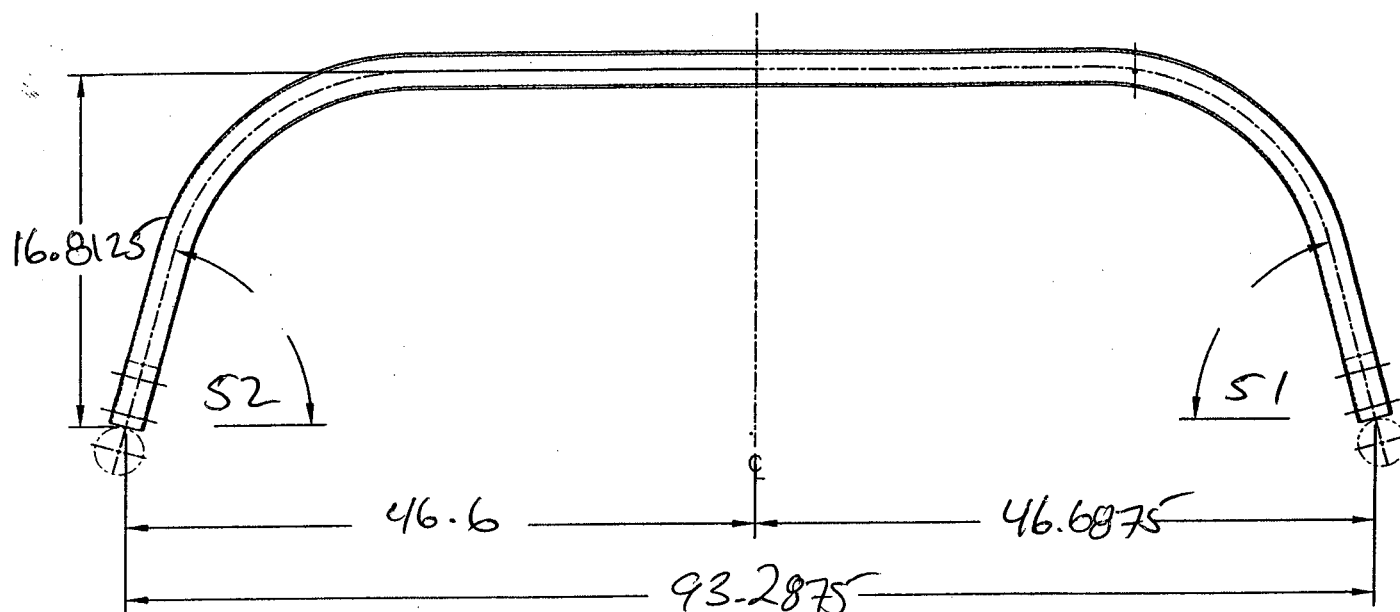
| Drawing Dimension | Tolerance | Actual Dimension | Accept | Reject | Method of Inspection | Comments |
|-------------------|------------------------|------------------|--------|--------|----------------------|----------|
| 2.612 | $\pm .008$ -0.000 | 2.615 | ✓ | | | |
| 2.612 | " | 2.615 | ✓ | | | |
| 2.726 | " | 2.731 | ✓ | | | |
| 2.855 | " | 2.860 | ✓ | | | |
| 2.994 | " | 2.997 | ✓ | | | |
| 3.134 | " | 3.137 | ✓ | | | |
| 3.256 | " | 3.259 | ✓ | | | |
| 3.256 | " | 3.259 | ✓ | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 2.612 | " | 2.615 | ✓ | | | |
| 2.612 | " | 2.615 | ✓ | | | |
| 2.726 | " | 2.731 | ✓ | | | |
| 2.855 | " | 2.860 | ✓ | | | |
| 2.994 | " | 2.997 | ✓ | | | |
| 3.134 | " | 3.137 | ✓ | | | |
| 3.256 | " | 3.259 | ✓ | | | |
| 3.256 | " | 3.259 | ✓ | | | |
| | | | | | | |
| 123.58 | $\pm .030$ | 123.58 | ✓ | | | |

| | | |
|-------------------|----------------|---------------------|
| Measured by: J.F. | Audited by: En | Prototype Approval: |
| Date: 07/05/24 | Date: 07/05/24 | Date: |

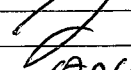
| Rev | Date | Change | Revised by | Approved |
|-----|------|-----------|------------|----------|
| A | | New Issue | KJ/JLM | |

| | | | |
|---|--|--------------|--------------|
| DART AEROSPACE LTD | | Work Order: | 32445 |
| Description: Crosstube Low Narrow Aft (412) | | Part Number: | D412-664-205 |
| Inspection Dwg: D412-664-245 Rev: C | | Page 1 of 1 | |

| Required Dimension | Min | Max |
|--------------------|-------|-------|
| Height | 16.69 | 16.95 |
| 1/2 Span | 46.47 | 46.73 |
| Angle | 49° | 52° |
| Total Span | 92.94 | 93.46 |



| Comments |
|----------|
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| | |
|-----------------|---|
| QC15 Inspection |  |
| Date | |

2006-04

| Rev | Date | Change | Revised by | Approved |
|-----|----------|-----------|------------|----------|
| A | 07.04.27 | New Issue | KJ/JM | |



HeathAir

INTERNATIONAL (1991) INC.

681 Ave. Lepine, Dorval, Québec H9P 1G3
Tél.: (514) 636-1000 • Fax: (514) 636-0031

W.O. N° 36580

A.M.O. Number: 46/90

NON-DESTRUCTIVE TESTING REPORT

AIRCRAFT / COMPONENT INFORMATION

REGISTRATION:

MODEL/TYPE:

SERIAL NUMBER:

TOTAL HR/LDG:

OPERATED BY:

BASED AT:

INSPECTION REQUIREMENTS

Carry out FPI of (7) cross tubes (external surface) as per ASTM E-1417-05 and the Dart QSI 038, Section 4.1.1 (on file at client) - parts delivered to HeathAir.

Qty (1) P/N D212-664-101 S/N B31356.

Qty (1) P/N D412-664-203 S/N B30186.

Qty (2) P/N D212-664-201 S/N's B30423 and B30421.

Qty (3) P/N D412-664-245 S/N's B32445, B32447 and B32446.

☐ RADIOGRAPHY

☐ ULTRASONIC

☒ PENETRANT

☐ MAGNETIC PARTICLE

☐ EDDY CURRENT

INSPECTION REPORT

Fluorescent penetrant inspection was performed in accordance with the above requirements on (7) cross tubes.

Note: A Level 3 penetrant was substituted for the requested Level 2 (3 is more sensitive)
Ardrox 970P25E Batch #04B503.

(7) cross tubes inspected. (7) PASSED / (0) FAILED.

THE MAINTENANCE DESCRIBED ABOVE HAS BEEN PERFORMED IN ACCORDANCE WITH
THE APPLICABLE STANDARDS OF AIRWORTHINESS

INSPECTED BY: 

DATE

June 06, 2007

INSPECTION
STAMP(S) 

CUSTOMER INFORMATION

CUSTOMER: Dart Aerospace

P.O. NUMBER

PO 00003908

ADDRESS:

CONTACT NAME:

Linda Lacelle

LABOUR

@

\$

MATERIALS

@

TRAVEL EXPENSES

@

GST

HOTEL EXPENSES

@

PST

INVOICE NO.

TOTAL \$

WHITE COPY - INSPECTION FILE • YELLOW COPY - CUSTOMER • PINK COPY - ACCOUNTANT